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ABSTRACT

This report summarizes the formation of UNISIST and the topics of discussion at the first UNISIST meeting (1976) on the planning and implementation of national information activities in science and technology. Topics of discussion reported include: (1) the objectives of national information activities in the areas of science and technology; (2) the functions, structure, and establishment of national focal points for scientific and technical information services and policy development; (3) the setting of priorities for information activities in the context of national needs; (4) aspects of the implementation of a national information plan; and (5) the interaction of national information focal points with international and regional activities. Background details on the information revolution and information as a resource for development are also provided, as well as information on the development of the UNISIST program and its accomplishments. A list of six items of significance arising from the 1976 meeting concludes the report. (ESR)

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UNITED NATIONS EDUCATIONAL, SCIENTIFIC

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Information Policy for Development : National and International Responsibilities

Main Issues discussed at the First UNISIST Meeting on the Planning and Implementing of National Information Activities in Science and Technology

Herceg Novi, Yugoslavia
20-23 April 1976

Prepared under contract for Unesco by Scott Adams

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FOREWORD

We are pleased to present this account of the first UNISIST Meeting on the Planning and Implementing of National Information Activities in Science and Technology, which took place in Herceg Novi, Yugoslavia, April 20–23 1976.

The goal of this meeting, as well as of subsequent meetings to be organized in different countries in future, was to create an international forum within the framework of the UNISIST programme where those charged with the responsibility of planning and implementing national information systems and services in science and technology might identify shared problems and exchange experience which might lead to their solution.

It is foreseen that such exchange will have multiple benefits. Countries with less experience in the provision of information services can learn from those with more, and the industrialized countries can acquire a better understanding of the needs of the less developed, to assist them better.

Just as the invited participants represent focal points for national scientific and technical information programmes, so the UNISIST programme represents an international focal point of focal points to help the development of the national programmes. It is anticipated that the creation of this international forum will constitute a rich source of ideas for the future development of the UNISIST programme, and will assist it to become even more responsive to the needs of Unesco Member States.

A.R. Kaddoura
Assistant Director-General for Natural Sciences
and their Application to Development

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I. BACKGROUND

The Information Revolution

For the past 25 years all societies, developed and developing, have been coping with an Information Revolution. While its origins may be found in the explosion of technological innovation in the industrialized world of a generation ago, many other technological, social, and economic factors contribute to its progress today.

The headlong efforts of the industrialized countries to develop new information processing institutions and systems to cope with unprecedented quantities of new information, the panic phase, are over. The Information Revolution has come of age. We have developed new technologies and new systems to cope.

What we have not developed, in this more mature phase of the Revolution, are the social and institutional mechanisms to share, diffuse, and utilize the new information which has been and is being generated. While the industrialized countries have made some progress in this direction, newly established countries - lacking traditions of information handling, diffusion, and utilization - have been handicapped by lack of experience.

Information as a Resource for Development

Yet both developed and developing countries today recognize that scientific and technological information constitutes a resource for economic and social development. As a resource, information ranks with other major categories of resources on which the development equation is based : natural and human resources. As a special type of resource, however, it has certain characteristics which differentiate it from the other categories :

- It is inexhaustible. Unlike finite natural resources, it is replenishable and is constantly being regenerated.
- It is interactive with human resources. Men without information have diminished usefulness, and unless men use it, information has little value.
- It is self-renewing. Scientists and engineers continuously validate and update their knowledge.

Economists today are postulating the emergence of a "Knowledge Society", in which the capacity to utilize information and knowledge becomes the source of power and the potential for material wealth and social well-being as societies move toward technological and industrial growth. Increasingly, information is recognized by planners, policy-makers, and administrators as indispensable for the decision-making processes essential to development.

It is the recognition that specialized knowledge constitutes an instrument of social change and provides a new source of power for fueling the economy, that has led to the establishment of many national scientific and technological information systems and programmes in both industrialized

countries and those undergoing the process of industrialization. The developing countries have been vigorously promoting the organization of their energies and resources to improve their access to scientific and technological information they require for their economic development; they have made much progress over the last five years. As we shall see later, this recognition is world-wide; all countries, regardless of their level of development or form of government, have a commonality of interest in the role which specialized information plays in their economy. Solutions may vary, but the problems are similar.

This commonality of national interests has resulted in the escalation of attention to the roles which the United Nations itself and through its specialized agencies, might play to assist the individual efforts of its Member States. Co-operative efforts have been undertaken to develop U.N.-sponsored systems for the international transfer of specialized scientific and technological information in the nuclear energy, agricultural, educational, industrial, and environmental quality sectors, and further efforts are being planned for the fields of population, science policy, informatics, architecture, and the development sciences.

Indeed, under current study at the request of the Secretary General of the United Nations is the question of how the United Nations might assist its Member States in developing mechanisms for the international sharing of technological information supportive of the international transfer of technologies.

These U.N. efforts have been supplemented by those of the regional inter-governmental organizations. The Organization for Economic Co-operation and Development, the European Communities, the Organization of American States, the International Centre of Scientific and Technical Information in Moscow, to mention a few, are equally concerned with co-operative activities for the sharing of scientific and technological information resources for economic development.

In short, it is in response to this new perception of the value of scientific and technological information for economic and social growth that both individual countries and international organizations have redoubled their efforts to plan, organize, and develop specialized information services in recent years. These activities have reinforced the earlier efforts of both national and international non-governmental bodies of scientists and engineers to preserve the traditional open channels of international communication in an era of unprecedented growth.

By the early 1960's it had become evident to forward-looking scientists and planners that in order to channel the new knowledge being generated into productive uses certain conditions needed to exist. Among these were :

- Governments must dedicate a suitable proportion of their attention and resources to information systems and services at the national level.

- A recognition of common goals and objectives must be attained at the international level.

- Standards permitting the interchange of information products and services both within and between countries must be established

. A suitable intergovernmental mechanism must be developed to ensure continuity and harmonisation of both national and international efforts.

II. THE UNISIST PROGRAMME

In a common recognition of the need to meet these conditions and to guide the course of the Information Revolution, Unesco and the International Council of Scientific Unions joined forces in 1967 to undertake the three-year feasibility study which led to the establishment of the UNISIST programme. Consistent with the belief that it is national governments working individually or in consort which supply the dynamics of economic and social development, the UNISIST Central Committee included the following recommendations in its report :

> (Recommendation 15) "A governmental or government-chartered agency should exist at the national level to guide, stimulate, and conduct the development of information resources and services in the perspective of national, regional, and international co-operation. These agencies should in particular give their support, or themselves adhere to, co-operative programmes of international scope in consonance with the principles and goals of UNISIST."

And, again, with particular reference to the needs of developing countries :

> (Recommendation 20) "... developing countries should consider the following actions as instrumental to the purposes of UNISIST : (i) the establishment of a central scientific and technical information agency, responsible for planning and co-ordinating the information resources; (ii) the establishment of co-operative agreements with other countries; (iii) promotion of the adoption of standards, methods and procedures that might facilitate the integration of information services into a world-wide network."

The UNISIST Intergovernmental Conference of October 1971 approved these recommendations, and by Resolution 2.131 the 17th General Conference of Unesco voted the UNISIST programme into being.

The Need for Strong National Focal Points

The need for strong governmental or government-chartered agencies, commonly called "national focal points", was clearly recognised by all : the UNISIST Central Committee, the UNISIST Intergovernmental Conference, the Unesco General Conference, and Unesco's Member States themselves. The reasons for this can be readily stated :

. Countries, particularly developing countries, are in great need of national programmes to guide the development of their information service infrastructure (manpower, information resources, delivery systems, libraries, etc.). A national focal point is essential to the planning, co-ordinating and promoting of infrastructure development.

- A national focal point, sensitive to national development needs and priorities, is a prerequisite to the effective planning of information service components of national plans for economic and social development.

- A national focal point is essential for the co-ordination of sectoral information resources and services.

- A national focal point is essential for the effective utilization of both domestic and foreign information resources, including those being developed by sectoral agencies of the United Nations.

In the role prescribed by the UNISIST Central Committee, the Intergovernmental Conference, and the Unesco General Conference, the UNISIST programme was conceived of as a catalytic force. A catalyst may be defined as an entity, the presence of which initiates or continues a desired reaction. In this context, the UNISIST programme was created as a social catalyst, designed to stimulate and guide the healthy growth of national scientific and technological information resources and services in the light of international co-operation. To this end, the UNISIST programme, under the guidance of its Intergovernmental Steering Committee and its Advisory Committee of Experts, has engaged in a number of activities since 1972.

UNISIST Accomplishments

By letter of July 25, 1973, the Director-General of Unesco invited Member States to designate national focal points, and to establish national committees for the co-ordination of the country's participation in the UNISIST programme. Annexed to his letter were two sets of guidelines, the first suggesting the functions and composition which a National Committee for UNISIST might undertake, and the second, proposing the functions, location, and modus operandi of a National Focal Point. (Annex III)

The response to this invitation has been gratifying. By mid-1976, over 50 countries had established more than 80 national focal points and/or national committees for UNISIST.

In further assistance to its Member States, the UNISIST programme prepared and distributed a set of UNISIST Proposals for Information Policy Objectives.* Designed for the use of the managers of national focal points, this is a comprehensive checklist of the technological and functional aspects of specialized information facilities which require policy decisions.

Through regional conferences of governmental experts in Colombo (December 1974), New Delhi (March 1976) and Tunis (April 1976), the UNISIST programme has sponsored efforts to promote the development of national information policies by identifying problems common to the national members of regional groups, to share solutions where available, and to promote bases for regional co-operation and common information policy formulation, providing political support for the establishment of regional information networks. Further regional conferences are foreseen in Southeast Asia, East Africa, and in Latin America. Advice is also provided by UNISIST, on request, to individual Member States, on the establishment of national focal points and UNISIST committees.

*Information Policy Objectives : UNISIST Proposals. Paris, Unesco, April 1974. 26 p. (SC/74/WS/3)

III. THE HERCEG NOVI MEETING

Because of the high priority accorded to the function of scientific and technological information programmes in national development, Unesco and the UNISIST Steering and Advisory Committees, recognized the urgent need to create a forum for the exchange of experience on the problems faced by national focal points responsible for planning, organizing, and implementing scientific and technological information services.

To meet this need, a first UNISIST Meeting on the Planning and Implementing of National Information Activities in Science and Technology was organized, and with the co-operation of the Yugoslav National Commission for Unesco, and the International Development Research Centre of Canada, was held in Herceg Novi, Yugoslavia, from 20 to 23 April 1976.*

Participants in this meeting were invited in their personal capacity from 30 Member States of Unesco, with both an equitable geographical distribution and a balance of industrialized and developing countries in view. The conduct of the meeting was informal, without official report, conclusions, or recommendations. Instead, the present document has been prepared. It is intended to present views expressed by the authors of the working papers, the moderators of the discussions, and the participants. It draws as well on the "country papers" and presentations reporting national experiences in establishing focal points made by the participants from the following countries : Austria, Brazil, Federal Republic of Germany, India Indonesia, Ireland, Mexico, Peru, Poland, Spain, and the USSR.

This document is structured in accordance with the principal issues which emerged during the five sessions of the meeting, and rather than attributing views to individuals, attempts to identify areas and topics in the discussion where there was either a general consensus or marked diversity.

SESSION I : MAIN OBJECTIVES OF NATIONAL INFORMATION ACTIVITIES

At the opening session of the Herceg Novi meeting, the participants were invited to address the following broad questions : "Why does a country need a national scientific and technological information policy? What should its main objectives be? What should it cover? How should it be formulated? How can the formulation of an information policy be integrated in other national policy objectives?"

In the discussion which followed the presentation of the keynote paper, there was general agreement that the initial UNISIST proposals on information policy objectives was a valuable first effort.** However, it had concentrated on the technical objectives of effective scientific and technological information facilities and a broader scope for policy was desirable. Since its publication there has grown an impressing awareness that scientific and technological information policy must be viewed as an integral component of national policy for economic and social development. Several reasons were given for this :

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*The Agenda and List of Participants are given as Annexes I and II.

**op.cit.

1. Scientific and technological information is a major resource for economic development, comparable to skilled manpower, mineral wealth, agricultural and industrial capabilities. Governments, which had paid so much attention to the development of national policy in other resource areas, require policies equally for the utilisation of information resources.

2. Governments have made major investments in the acquisition and utilization of information, ranging from its production through education, research, surveys, studies and expert consultants, through its management in communication systems, information centres, and libraries, to its diffusion and utilization. Indeed, a recent study on the economics of information supply suggests that the costs of processing information through formal systems are still modest compared to the costs incurred by scientists and engineers in locating and retrieving it. The magnitude of these investments suggests the need for national policy to guide the establishment of priorities.

3. As the close association between information services and the international transfer of technology suggests, the national provisions for scientific and technological information are immediately supportive of technological, industrial, social and other aspects of development.

The participants from at least half of the countries reporting the establishment of national focal points noted the integration of policy formulation and planning for national scientific and technological information services, with the overall economic planning undertaken by their countries. They agreed that in order to constitute a vital force for national development, this information policy and planning must go hand in hand with national policy formulation and national development efforts. The corollary of this position was also agreed to : there should be a closer relationship between priorities and policies for information and other national development priorities : agricultural productivity, industrialization, education, and the like.

In recognition of this turn of events, it was suggested that the UNISIST programme might undertake the creation of a new set of guidelines for Member States, to cover not so much the technical aspects of information services, but rather their integration into the economic and social policy structures of the countries.

Recognizing the diversity of economic conditions under which planning for information services takes place within the Member States, the participants concurred that no international programme, such as UNISIST, could prescribe a universal formula for such planning. Rather, any new set of guidelines might delineate the various objectives between which choices might be made, or alternatively constitute a checklist of considerations for reference in the formulation of national policy and plans.

The introductory presentation had identified the thinking of leading economists concerning the emerging "knowledge society" as a successor to pre-industrial and industrial economies. As information and knowledge become new sources of power, material wealth and social well-being, governments will need not only to understand this phenomenon, but to revise their national priorities and establish new policies. While the concept was new to some of the participants, one indicated that his country is postulating the development of its national scientific and technological information services on the reorientation of information services toward decision-making by government officials, plant managers, research directors, etc. He suggested that one of the reasons for the lack of support for scientific and technological information activities might be that the old institutional

forms appeared to the decision-makers to be costly and lacking in relevance to their decisions.

There was general agreement that national scientific and technological information policies will vary considerably from nation to nation. "Global" planning was considered impractical and undesirable. It is axiomatic that a national policy must serve a nation's perception of its significant needs and that such needs will vary widely. The UNISIST programme should therefore recognize the necessity of flexibility in accommodating to the planning activities of the participating countries.

However, all countries have a concern for the basic broad divisions of information flow. It is likely that national policies for scientific and technological information will have these features in common :

1. Information generated within the country. Since this is a resource in which national funds have been invested, it would appear desirable to have policies relating to its availability, both within the national and to other nations, to ensure its accessibility in response to national needs and development priorities.

2. Information acquired from outside the country. Policy should provide that information be appropriately selected and organized so that it, too, is responsive to national needs and development priorities.

3. International co-operative activities. Countries will need to create policy relating to their participation in bilateral, regional, and international programmes, as exemplified by UNISIST for the co-operative development of information resources and services.

SESSION II : FOCAL POINTS : FUNCTIONS, STRUCTURE, ESTABLISHMENT

Policy represents a selection among optional forms of action to achieve an objective. Planning is one such optional approach; a planning requirement does not necessarily follow from the establishment of national policy. A national focal point may be limited to policy-making functions or may have operational responsibilities combined with policy formulation.

It soon became apparent in the discussion, and from the "country papers" which were presented at the meeting, that there was a great diversity of approaches both in relation to the organization and structure of a national focal point, and to the functions entrusted to it.

The great majority of the countries have established their national focal points in association with the national agency responsible for scientific and technological development. In some, close liaison had been arranged with a national planning agency; in others, not. In some, the national focal point was responsible for policy development and co-ordination only; in others, it had operational responsibilities as well, and functioned as a national centre for scientific and technological information services.

The participants early reached the opinion that no fixed formula could adequately represent the differences in the political and social structures of the countries; that each national focal point must accommodate to its own governmental structure and needs.

Far more time was spent on the more basic issue, that of the functions of a national focal point. While there was some divergence of views, and of the experience reported in "country papers", the participants focused their discussion on the following functional responsibilities of a national focal point :

1. Formulation of national policy for scientific and technological information services. This had been discussed in the first session. The participants ranked it high on the list of functions to be exercised through the focal point.

2. The development and maintenance of national planning for scientific and technological information facilities. The discussion on this point reflected the wide diversity among national commitments to economic planning on the one hand and a variety of personal experiences on the other. Points were made that the rapidity of technological development in the information-handling field and the uncertainties involved in governmental funding mitigated against long-range planning. Under these conditions, long-range planning resulted in a lack of flexibility. However, it was also pointed out that states which had made commitment to long-range planning had made provision for annual reviews and adjustments which maintained flexibility. Participation in co-operative international information-handling programmes, such as INIS and AGRIS, required the commitment of resources over a period of time, and hence necessitated a national plan. Two opposing views were expressed : one, that long-range planning for scientific and technological information services can be accomplished only by states which controlled the available resources and were firmly committed to economic planning; the other, that planning is best done at the operational level where its successes and failures can be measured, rather than at the overall national level.

It was also noted that countries with limited resources must calculate in advance for their optimal allocation, and hence must develop national plans and establish priorities.

Despite this variety of views, certain conclusions emerged without challenge. Among these were : (a) planning at some level and over limited time spans is an essential and inescapable necessity, if only for purposes of next year's budget, and (b) in countries which have made a commitment to national economic planning, it is essential that planning for scientific and technological information services be done in association with and in reinforcement of this national economic planning effort.

3. Co-ordination of sectoral interests. Many countries today are proceeding with plans for scientific and technological information services which envision decentralized networks of sectoral information services : agriculture, health, industry, mining, etc. To ensure the productive inter-relationship of these sectoral information services is a key responsibility of the national focal point. Recognizing the practical difficulties involved in such co-ordination, the meeting reaffirmed it as a necessary function associated with the leadership role of a national focal point.

4. Research. It was generally agreed that a national focal point has responsibility for conducting or supporting research and development related to the definition of user needs and the development of systems and services to meet them.

5. Operations. A number of the participating countries, particularly the smaller ones, had associated their national focal points with operational centres for scientific and technological information services. Along with the well-known general disadvantages of associating policy making with operational functions, two principal advantages of such association were noted. First, the provision of services provides a clearer insight into the actual needs of the user communities; and, second, economy of effort can be achieved, particularly by smaller countries. There were no "best solutions", and no conclusions beyond agreement that operations were a valid function of a national focal point if this was consistent with the national requirement.

6. International representation. There was universal agreement that the focal point was uniquely qualified to serve as a locus for the intergovernmental organizations. Indeed, it was pointed out that national focal points were basic to regional activities, a country cannot commit itself to this form of co-operative activity without one, although early participation in regional activities can stimulate the establishment of such bodies.

The members confirmed the wisdom of Unesco in inviting its Member States to establish national focal points and UNISIST National Committees for the dual purpose of national development and participation in the UNISIST intergovernmental programme. The wish was expressed that future meetings to be convened within the UNISIST framework pay particular attention to the international linkage of national focal points. Finally, it was pointed out that national focal points are necessary to enable countries to participate in the co-operative information systems such as INIS, AGRIS, SPINES AND DEVSIS and to share in the development and governance of these systems.

7. Provide leadership for the development of a national network of scientific and technological information services. To provide for consistent direction and effective management, the national focal point must assume a leadership role. The UNISIST programme had been of significant assistance in developing a favourable climate to convince governments of the need to co-ordinate their information programmes under a lead agency. Such leadership should initiate and activate at the national level the development of resources (personnel, budgetary, organizational, planning) required for effective information services. Such leadership should also represent at the national level the contribution of scientific and technological information activities to the formulation of national science policy, to economic development, and to national programmes for technology transfer. It should also function to orient information users at all levels, including governmental, to the role played by information services in national development. Finally, the leadership should promote and support the use of specialized information by decision-makers at all levels of the scientific, technological, and administrative communities.

SESSION III : SETTING PRIORITIES IN THE CONTEXT OF NATIONAL NEEDS

The participants were invited to address four questions : "What constitutes a proper balance between priorities accorded short- and long-term planning? Information service for scientific research required the former; information service for economic development the latter. How can we involve the users of information in assisting in the establishment of priorities? How can informal communication practices be handled within a national information programme? How can proprietary information be handled within a national programme?"

It was generally conceded that national priorities in terms of sectoral areas, user purposes, and groups to be served, were largely derivative from

priorities established elsewhere in the political process. Information services, being subordinate to broader national development programmes, must by their nature conform to and subserve these broader public purposes.

Discussion took place, instead, over the optional means available to national focal points for the provision of information services supportive of such national goals. In the setting of priorities for information service, what boundaries delimiting the responsibilities of a national focal point should be established? Should it be limited to report and literature handling systems? Should the focal point assume responsibility for and assign priority to computer applications for management purposes? Should it be responsible for the provision of services based upon critically evaluated numerical data in the natural sciences, or for social science data systems? For the publishing industry? All participants were aware of the needs for establishing terms of reference within which a national focal point might effectively operate; but no definitive answer emerged.

The role of "gate keepers" in the selection and transmission of technological information, as well as of "invisible colleges" in scientific communities, were discussed sympathetically. A division of opinion appeared on the relevance of "invisible colleges" to formalized information systems. It was however recognized that such informal communication practices were of benefit in filtering the world's intellectual output for national application. It was proposed that Unesco undertake a study of informal communication mechanisms in science and technology, and their relationship to the UNISIST programme.

Three countries reported in some detail their experience with industrial information liaison officers, who provide consultation and information service to small industries, bringing them the most recent information concerning useful technological innovations. Countries with successful experience with this service reported that one officer could serve from 130-200 enterprises, depending on the character of the industry. If national focal points exist primarily to support decision-making, the development of new active mechanisms, such as extension agents providing immediately useful information, should be accorded high priority.

To the question, "Should focal points accept responsibility for transferring proprietary information?" there was general endorsement. It was pointed out that proprietary information is information which is available at a price, or under special terms, and that the patent systems of all countries make proprietary information available.

The point was also made that a national focal point should assume responsibility for the provision of abstracting services covering the indigenous technological literature of the country. This is particularly needful in areas of applied science where the technician-users cannot use the international services in unfamiliar languages.

Also considered was the question of centralized versus decentralized information systems, noting that for the latter the establishment of communication networks, switching mechanisms, and referral centres should have a high priority in national scientific and technological information strategies.

One question generated considerable discussion. It was : "What can international organizations do to advance national planning?" This developed a general agreement that manpower needs in developing countries were a top priority, and that international organisations, such as Unesco and IDRC, can make a major contribution through supporting educational and training programmes for manpower development. Particularly needed was training for management of information systems.

The participants from the developing countries generally agreed that education of the future managers of their information services in foreign industrialized countries was desirable. Such individuals could acquire the broad outlook and versatility essential to the planning and development of information services supportive of economic growth. In distinction, training in specific information-handling skills might be left to the national and local levels. It was also suggested that international organizations could usefully develop international referral systems through which national centres of specialized information could make their services available, including expert consultation, to other countries.

Also desirable would be a world-wide register of experts available for consultation in the field of scientific and technological information. In addition, the importance of forecasting future trends was stressed and it was suggested that international organizations could co-ordinate such forecasting efforts.

It was also agreed that international organizations alone are capable of promoting the development of international standards to facilitate interchange of information between and among focal points and systems, and the accomplishments of the UNISIST programme to this end were noted.

One ingenious suggestion, referred for study, was that national focal points, with UNISIST assistance, develop a "twinning" arrangement, similar to that observed by many municipalities in different countries, whereby the national focal points could exchange personnel and experience for periods of time.

There was general concurrence in the proposition that user feedback should be given high priority in the development of national information services. Preference was stated for daily informal feedback for monitoring purposes rather than dependence on formal evaluative studies. The importance of involving user participation in the planning, management, and evaluation of national information systems was stressed.

Other devices suggested for securing feedback included the imposition of user charges, the provision of postcard evaluations, and the use of the scientific and technological information system as an incentive award mechanism.

There was also general concurrence in the proposition that the smaller countries should not wait for mechanization to develop their information services, but should start immediately with the idea of converting later, if desired.

A final consideration also related to developing countries. They should make immediate provisions to share the information which they are generating, frequently on problems common to more than one country, with other developing countries, and internationally.

SESSION IV : ASPECTS OF IMPLEMENTATION OF A NATIONAL INFORMATION PLAN

"Country papers" which described realistically the types of problems experienced by individual countries in establishing a national focal point and in implementing a national information system were presented. These range from the difficulties in securing a clear mandate at an appropriate level of authority within the country to budgetary competition with other

agencies of government, to problems of co-ordinating the sectoral and other information functions and services of the country, to the need for training technical manpower, and problems in acquiring book, journal, and report information resources.

In discussing these papers, the following topics drew special attention :

1. Problems of national co-ordination. These were of two types, extra-governmental and intra-governmental. In the first area fell such problems as co-ordination of governmental programmes with those of commercial information services, non-governmental organizations, including scientific societies. Included in the latter area were problems of intra-governmental co-ordination involving inter-ministerial relationships with agencies responsible for the development of sectoral information systems. It was noted, for example, that in at least one country the sectoral information systems are funded in part by government and in part by private interests, with priorities between and among the sectors established largely by user pressures.

Several points were made on the subject of intra-governmental co-ordination. First, that the location of a national focal point in government is of secondary importance compared to voluntary inter-ministerial co-operation. Second, that persuasion toward self-interested co-operation is far more effective than national statutory authority as a means of achieving co-ordination.

Closely related to this question is the problem of co-ordination with national programmes for library development. Scientific and technical library resources are of the utmost importance to national information plans. Responsibility for library development, however, is in most instances lodged with a Ministry of Education. The need for close co-ordination is evident, at all levels, international as well as national, in order that countries may achieve optimum returns for their investment in information services.

2. Organization for interdisciplinary problem-solving. Another major problem area is that of the organization of information services for the handling of interdisciplinary problems. The field of technology transfer, for example, is highly complex. How can a country's information resources and services be marshalled to provide optimum assistance to the selective importation and implantation of industrial innovation? It was suggested that the willingness of the managers of sectoral information centres to co-operate was critical to attack on interdisciplinary problems.

3. Information analysis centres. The establishment of information analysis centres (IACs) was cited as yet another area requiring attention. Countries should not needlessly spend national resources to duplicate existing centres intended to serve international users, and they should upgrade those unique centres which they have established at the national level so they are capable of providing services to other countries.

4. Economics of information. In the area of economics of information, a trend was noted toward cost sharing, with governmental sources supporting the availability of information and users paying for their access to it.

Finally, noting the various connotations which had been applied, and attached to the technical terminology used by the participants, one suggestion was made that the UNISIST programme promote efforts to standardize the vocabulary of information science at the international level.

SESSION V : INTERACTION OF A FOCAL POINT WITH INTERNATIONAL AND REGIONAL ACTIVITIES

The moderator of the closing session proposed that the participants focus on three topics : (1) the role of national focal points in international co-operation; (2) national participation in international systems; (3) the usefulness of meetings of this sort, and suggestions for the future.

Noting that several U.N. agencies were providing technical assistance to developing countries through unrelated programmes, the need for closer inter-agency co-operation through the catalytic action of the UNISIST programme was expressed. A first step to this end might be taken through the co-operative establishment of inventories of existing resources and infrastructure, as well as of assistance projects. The national focal point could play a useful role in advancing such co-ordination.

It was noted that a national focal point of necessity, whether acting directly or through a sectoral information system, will play a role in the development and governance of the specialized information services of the United Nations family : INIS, AGRIS, etc. The pros and cons of sectorally decentralized or centralized participation in such international systems were discussed briefly.

Where a country may be engaged in several of such co-operative enterprises, it is desirable to have it represented by a single voice in relation to its international participation rather than multiple and potentially conflicting interests. The question of the potential competition which these internationally developed systems represented to established and future non-governmental systems was raised. Would countries be prepared to support an indefinite number of them in the future?

The benefits derived by the participants in the AGRIS system were also described : training programmes, exchange of information on solution to specific national problems, economies achieved by the standardization practices of the international system.

Turning to the question of the role of national focal points in inter-national co-operation, it was agreed that this was an important subject. Since these sessions mainly dealt with the national roles and responsibilities of focal points, it was suggested to devote a session in future to their international roles.

On the question of the usefulness of a national focal point, one view expressed was that the organization of a national focal point consumed national resources which otherwise could be used for operational purposes. This view was opposed by a majority who thought that the creation of national focal points was essential to the development of scientific and technological information services in their countries and to their international co-operation, and that the UNISIST programme was to be commended for pursuing the objective of establishing and assisting national focal points.

It was generally agreed that the meeting had been highly productive. The participants then discussed the desirability of holding future meetings of national focal points on a regional or on an international basis. A commonality of language, of levels of economic and social development, and of common international political bonds argued for the former. The need to share

information internationally, regardless of region or level of development, argued for the latter. A compromise was suggested : that an international meeting be held each year under UNISIST sponsorship on a different continent. In addition, it was suggested that such meetings be programmed to include a workshop on a theme of paramount concern to that region, e.g. training.

This concluded the first UNISIST Meeting on Planning and Implementing National Information Activities in Science and Technology. One conferee in the closing minutes summed up his evaluation in words which expressed the thoughts of all. The four days of discussion, in his opinion, established a consensus that the problem of organizing national information services had features perceived to be common by the representatives of the highly industrialized countries and those from the developing countries alike. A dialogue had been successfully established between the two, and a continuation of such dialogue was essential. Further, despite the diversity of governmental structures and philosophies, the managerial problems of organizing information services at the national level, and participation in international activities demonstrated a homogeneity. For this reason, because all could agree on the main issues to be addressed and all could achieve an understanding of each other's problems, the first conference was to be considered a success and augured well for future ones.

IV. SIGNIFICANCE OF THE HERCEG NOVI MEETING

(Note by Rapporteur)

Although, by pre-agreement, no conclusions were reached at the Herceg Novi meeting, no recommendations made, nor minutes kept, nor attributions to individual speakers, it does seem appropriate to provide an interpretive summary of the discussions in this note by the Rapporteur :

First, this meeting was the first of its kind. It served to open a dialogue on a number of important issues (e.g. international linkages of national focal points; roles of national focal points in the transfer of technology) which will require further exploration. Future meetings at either regional or international level may be anticipated.

Second, the issues and the problems involved in establishing and operating national information services appear to be common to developed and developing countries alike. Both are seeking modern solutions to a classic problem which has become critical. This augurs well for future meetings on international co-operation among the national focal points.

Third, there appeared to be general agreement that national focal points were essential to the development of the infrastructure for national information system development, and that national information systems were essential to effective international participation whether bilateral, regional, or in conjunction with the co-operative efforts developed within the United Nations.

Fourth, there was also general agreement that national policies for scientific and technological information should be closely associated with other areas of national policy formulation : scientific, technological, agricultural and industrial development, economic and social progress and well-being.

Fifth, where there is a national planning commitment; planning for the provision of scientific and technological information services is an essential component of the national plan.

Sixth, developing countries in particular should assign high priority to the utilization of scientific and technological information resources in their programmes for the acquisition and implantation of new technologies.